

2. A stiffener as claimed in claim 1, the IC-PCB carrier package being one of a flip chip pin grid array (FC-PGA) and a flip chip ball grid array (FC-BGA) carrier package.

3. A stiffener as claimed in claim 1, the stiffener is substantially made of at least one of a metal-like, plastic-like, glass-like and ceramic-like material, is one of a molded, stamped, etched, extruded and deposited stiffener, and is capable of withstanding high temperatures of at least one of an IC die bonding operation and normal IC operation.

4. A stiffener as claimed in claim 1, the stiffener being planar for mounting to a die-side major planar surface of the substrate.

5. A stiffener as claimed in claim 1, the stiffener having an internal window therein to provide clearance for at least one of a die, under-fill, die side components (DSC), and integrated heat spreader (IHS).

6. A stiffener as claimed in claim 1, the stiffener being a multi-part stiffener.

7. A stiffener as claimed in claim 1, the stiffener having an above-substrate-plane height when mounted, which is less-than or equal to an above-substrate-plane height, when mounted, of one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

8. A stiffener as claimed in claim 1, the stiffener having a top surface above a substrate-plane when mounted, which is substantially co-planar with, when mounted, a top surface of one of: an IC-die, and a combination of an IC-die with an integrated heat spreader.

9. (Amended) A stiffener as claimed in claim 8, the stiffener being disposable to co-support a heat sink, with one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

10. A stiffener as claimed in claim 1, where if a main body of the stiffener is electrically conductive, the stiffener further includes an insulator to electrically insulate electrical members on stiffener-opposing areas of the substrate.

11. A stiffener as claimed in claim 1, the stiffener being an edge stiffener for mounting to minor-planar side-surfaces of the substrate.

12. (Amended) A stiffener as claimed in claim 1, the edge stiffener having a non-flat cross section mate-able with the side-surfaces of the substrate.

13. (Amended) A stiffener as claimed in claim 1, where the edge stiffener is pre-attachable to the substrate by an IC-PCB carrier package manufacturer.

Sub B1
14. A thin-core or coreless integrated circuit printed circuit board (IC-PCB) carrier package comprising: a stiffener to provide stiffening support to one of a thin-core and coreless substrate of the IC-PCB carrier package.

15. An IC-PCB carrier package as claimed in claim 14, the IC-PCB carrier package being one of a flip chip pin grid array (FC-PGA) and a flip chip ball grid array (FC-BGA) carrier package.

al Cont
16. An IC-PCB carrier package as claimed in claim 14, where the stiffener is substantially made of at least one of a metal-like, plastic-like, glass-like and ceramic-like material, is one of a molded, stamped, etched, extruded and deposited stiffener, and is capable of withstanding high temperatures of at least one of an IC die bonding operation and normal IC operation.

17. An IC-PCB carrier package as claimed in claim 14, the stiffener being planar and mounted to a die-side major planar surface of the substrate.

18. An IC-PCB carrier package as claimed in claim 14, the stiffener having an internal window therein to provide clearance for at least one of a die, under-fill, die side components (DSC), and integrated heat spreader (IHS).

19. An IC-PCB carrier package as claimed in claim 14, the stiffener being a multi-part stiffener.

Sub B' 20. An IC-PCB carrier package as claimed in claim 14, the stiffener having an above-substrate-plane height, which is less-than or equal to an above-substrate-plane height, when mounted, of one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

al Cont 21. An IC-PCB carrier package as claimed in claim 14, the stiffener having a top surface above a substrate-plane, which is substantially co-planar with, when mounted, a top surface of one of: an IC-die, and a combination of an IC-die with an integrated heat spreader.

22. (Amended) An IC-PCB carrier package as claimed in claim 21, the stiffener being disposable to co-support a heat sink, with one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

23. An IC-PCB carrier package as claimed in claim 14, where if a main body of the stiffener is electrically conductive, the stiffener further includes an insulator to electrically insulate electrical members on stiffener-opposing areas of the substrate.

24. An IC-PCB carrier package as claimed in claim 14, the stiffener being an edge stiffener mounted to minor-planar side-surfaces of the substrate.

Sub
B1

25. An IC-PCB carrier package as claimed in claim 14, the edge stiffener having a non-flat cross section which is mated with the side-surfaces of the substrate.

26. An IC-PCB carrier package as claimed in claim 14, where the edge stiffener is pre-attached to the substrate by an IC-PCB carrier package manufacturer.

al
Cont

27. A packaged integrated circuit (IC) comprising:
a thin-core or coreless integrated circuit printed circuit board (IC-PCB) carrier package comprising a stiffener to provide stiffening support to one of a thin-core and coreless substrate of the IC-PCB carrier package.

28. A packaged IC as claimed in claim 27, the IC-PCB carrier package being one of a flip chip pin grid array (FC-PGA) and a flip chip ball grid array (FC-BGA) carrier package.

Sub
B2

29. A packaged IC as claimed in claim 27, where the stiffener is substantially made of at least one of a metal-like, plastic-like, glass-like and ceramic-like material, is one of a molded, stamped, etched, extruded and deposited stiffener, and is capable of withstanding high temperatures of at least one of an IC die bonding operation and normal IC operation.

30. A packaged IC as claimed in claim 27, the stiffener being planar and mounted to a die-side major planar surface of the substrate.

31. A packaged IC as claimed in claim 27, the stiffener having an internal window therein to provide clearance for at least one of a die, under-fill, die side components (DSC), and integrated heat spreader (IHS).

32. A packaged IC as claimed in claim 27, the stiffener being a multi-part stiffener.

al
cont
33. A packaged IC as claimed in claim 27, the stiffener having an above-substrate-plane height, which is less-than or equal to an above-substrate-plane height, when mounted, of one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

34. A packaged IC as claimed in claim 27, the stiffener having a top surface above a substrate-plane, which is substantially co-planar with, when mounted, a top surface of one of: an IC-die, and a combination of an IC-die with an integrated heat spreader.

Sub B3
35. (Amended) A packaged IC as claimed in claim 34, the stiffener being disposable to co-support a heat sink, with one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

36. A packaged IC as claimed in claim 27, where if a main body of the stiffener is electrically conductive, the stiffener further includes an insulator to electrically insulate electrical members on stiffener-opposing areas of the substrate.

37. A packaged IC as claimed in claim 27, the stiffener being an edge stiffener mounted to minor-planar side-surfaces of the substrate.

al
Cont
38. A packaged IC as claimed in claim 27, the edge stiffener having a non-flat cross section which is mated with the side-surfaces of the substrate.

39. A packaged IC as claimed in claim 27, where the edge stiffener is pre-attached to the substrate by an IC-PCB carrier package manufacturer.

Please add the following new claims.

40. (New) A stiffener member disposable onto at least one of a thin-core and coreless substrate of an integrated circuit printed circuit board (IC-PCB) carrier package to provide stiffening support thereto.

ad
41. (New) A stiffener as claimed in claim 40, the IC-PCB carrier package being one of a flip chip pin grid array (FC-PGA) and a flip chip ball grid array (FC-BGA) carrier package.

42. (New) A stiffener as claimed in claim 40, the stiffener is substantially made of at least one of a metal-like, plastic-like, glass-like and ceramic-like material,

is one of a molded, stamped, etched, extruded and deposited stiffener, and is capable of withstanding high temperatures of at least one of an IC die bonding operation and normal IC operation.

43. (New) A stiffener as claimed in claim 40, the stiffener being planar for mounting to a die-side major planar surface of the substrate.

44. (New) A stiffener as claimed in claim 40, the stiffener being a multi-part stiffener.

45. (New) A stiffener as claimed in claim 40, the stiffener being disposable to co-support a heat sink, with one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

46. (New) A thin-core or coreless integrated circuit printed circuit board (IC-PCB) carrier package comprising: a stiffener secured onto at least one of a thin-core and coreless substrate of the integrated circuit printed circuit board (IC-PCB) carrier package to provide stiffening support thereto.

47. (New) An IC-PCB carrier package as claimed in claim 46, the IC-PCB carrier package being one of a flip chip pin grid array (FC-PGA) and a flip chip ball grid array (FC-BGA) carrier package.

Sub 84
48. (New) An IC-PCB carrier package as claimed in claim 46, the stiffener is substantially made of at least one of a metal-like, plastic-like, glass-like and ceramic-like material, is one of a molded, stamped, etched, extruded and deposited stiffener, and is capable of withstanding high temperatures of at least one of an IC die bonding operation and normal IC operation.

AD Conf
49. (New) An IC-PCB carrier package as claimed in claim 46, the stiffener being planar for mounting to a die-side major planar surface of the substrate.

50. (New) An IC-PCB carrier package as claimed in claim 46, the stiffener being a multi-part stiffener.

51. (New) An IC-PCB carrier package as claimed in claim 46, the stiffener being disposable to co-support a heat sink, with one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

REMARKS

This paper is responsive to the paper(s) indicated above, and is responsive in any other manner indicated below.

RESTRICTION/ELECTION REQUIREMENT - TRAVERSED

A restriction/election requirement has been made for the reasons beginning on page 2 of the Office Action. Applicant respectfully traverses based upon the following grounds.